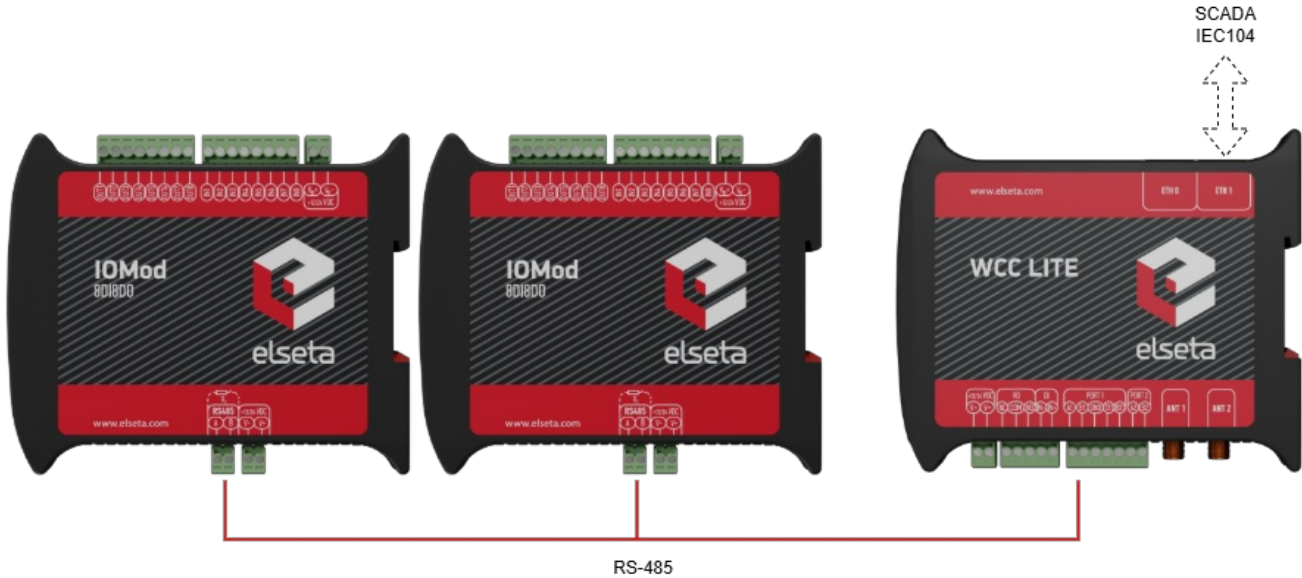


Connecting 2x 8DI8DO IOMod to the WCC Lite

Description

This article describes connecting and configuring two IOMOD 8DI8DO to the WCC Lite PORT1.



Each IOMod must be configured to match the Excel configuration. If using the template configuration, default parameters should be applied to the IOMod. IOMODs with firmware version 2 are configured using the IOMod utility application either via the USB port on the device's front panel or via the RS-485. Refer to the [IOMod 8DI8DO user manual](#)

Each IOMOD has its own set of parameters that can be adjusted without modifying the WCC Lite configuration. These can be accessed through the device's configuration menu.

If you are creating a custom configuration, especially when multiple devices of the same type are connected to the same port, make sure that the *Device_alias* values are unique for each device in the Devices sheet. Link address values must be different. Additionally, in the Signals sheet, *Device_alias* and *Signal_alias* combinations must not be duplicated across different devices.

Uploading configuration

The configuration can be modified to suit your specific needs. You can use the example provided above (2x_8DI8DO.xlsx) as a reference. If different IEC104 slave settings are required, they can be modified in the Excel configuration. For example, you can adjust settings such as *info_address* or *data_type* to match the desired behavior of the IEC104 slave. To test this example, specify your computer's IP address in the IEC104 slave's host column in the Excel file.

name	description	device_alias	enable	protocol	device	baudrate	databits	stopbits	parity	flowcontrol	scan_rate_ms	retry_count	timeout_ms	link_address	audi_address	time_sync_interval_sec	gl_interval_sec	bind_address	host	port	audi_size	cat_size	ba_size	rvt	t1	t2	t3	time_sync	message_size	cache_size	
IEC104 SCADA system	IEC104 SCADA signals	IEC104_SCADA	1	IEC 60870-5-104 slave														0.0.0.0	192.168.1.2	2404	2	2	3	8	12	15	10	20	1	249	100

Once the configuration is ready, upload it to WCC Lite via Configuration --> Choose file --> Import configuration.

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IMPORT PROTOCOL CONFIGURATION

Here you can import Excel configuration file. Up to 1000 signals are allowed. All previous signals will be replaced.

Configuration file: **1** No file chosen **2**

PLC (IEC-61499) Boot file: No file chosen

IEC61850 Client model file: No file chosen

IEC61850 Server model file: No file chosen

DOWNLOAD CONFIGURATION

Template configurations:

After the upload completes and no errors are detected, go to Protocol Hub --> Imported signals to verify that all signals have been successfully imported.

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Column filter

Device name	Signal name	Device alias	Signal alias	Value	Units	State	Attributes	Time
<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>
IOMod 8DI8DO_1	DI1	IOMod88_1	DI1	0			cot=20,org=0	2025-05-26 18:18:32.48
IOMod 8DI8DO_1	DI2	IOMod88_1	DI2	0			cot=20,org=0	2025-05-26 18:18:32.49
IOMod 8DI8DO_1	DI3	IOMod88_1	DI3	0			cot=20,org=0	2025-05-26 18:18:32.51
IOMod 8DI8DO_1	DI4	IOMod88_1	DI4	0			cot=20,org=0	2025-05-26 18:18:32.52
IOMod 8DI8DO_1	DI5	IOMod88_1	DI5	0			cot=20,org=0	2025-05-26 18:18:32.53
IOMod 8DI8DO_1	DI6	IOMod88_1	DI6	0			cot=20,org=0	2025-05-26 18:18:32.54
IOMod 8DI8DO_1	DI7	IOMod88_1	DI7	0			cot=20,org=0	2025-05-26 18:18:32.55
IOMod 8DI8DO_1	DI8	IOMod88_1	DI8	0			cot=20,org=0	2025-05-26 18:18:32.57
IOMod 8DI8DO_1	status DO1	IOMod88_1	DO1_status	0			cot=20,org=0	2025-05-26 18:18:32.58
IOMod 8DI8DO_1	status DO2	IOMod88_1	DO2_status	0			cot=20,org=0	2025-05-26 18:18:32.59
IOMod 8DI8DO_1	status DO3	IOMod88_1	DO3_status	0			cot=20,org=0	2025-05-26 18:18:32.61
IOMod 8DI8DO_1	status DO4	IOMod88_1	DO4_status	0			cot=20,org=0	2025-05-26 18:18:32.62
IOMod 8DI8DO_1	status DO5	IOMod88_1	DO5_status	0			cot=20,org=0	2025-05-26 18:18:32.63
IOMod 8DI8DO_1	status DO6	IOMod88_1	DO6_status	0			cot=20,org=0	2025-05-26 18:18:32.65
IOMod 8DI8DO_1	status DO7	IOMod88_1	DO7_status	0			cot=20,org=0	2025-05-26 18:18:32.65
IOMod 8DI8DO_1	status DO8	IOMod88_1	DO8_status	0			cot=20,org=0	2025-05-26 18:18:32.67

Before proceeding, check the protocol connections to confirm that both IOMOD 8DI8DO devices are connected to WCC Lite via PORT1. Open the Protocol Connections section to view all connected slave and master protocol devices.

PROTOCOL HUB	STATUS	SYSTEM	SERVICES	NETWORK	USERS	LOGOUT (ROOT)	WCC LITE
CONFIGURATION	IMPORTED SIGNALS	EVENT LOG	PROTOCOL CONNECTIONS	PROTOCOL LOGGER	SCRIPT-RUNNER		
PROTOCOL CONNECTIONS							
Device name	Device alias	Protocol	Host	Status	Timestamp		
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>		
IOMod 8DI8DO_2	IOMod88_2	IEC 60870-5-101 master	PORT1	Connected	2025-05-26 18:18:32		
IOMod 8DI8DO_1	IOMod88_1	IEC 60870-5-101 master	PORT1	Connected	2025-05-26 18:18:32		
IEC104 SCADA system	IEC104_SCADA	IEC 60870-5-104 slave	192.168.1.2	Connected	2022-03-25 10:11:40		
IEC101 SCADA system	IEC101_SCADA	IEC 60870-5-101 slave	PORT2	Disconnected	2022-03-25 10:11:38		

You can rename signal names according to your preferences.

signal_name	device_alias	signal_alias	source_device_alias	source_signal_alias	enable	math_expression	multiply	add	operation	units	min_value	max_value	absolute_threshold	threshold_units	suppression_time_ms	suppression_values	gl	log	common_address	info_address	data_type
DOOR OPEN	IOMod88_1	DI1			1								0.1	real			1	1	1	9	30

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☐ Column filter

Device name	Signal name	Device alias	Signal alias	Value	Units	State	Attributes	Time
<input type="text" value="IOMod 8DI8DO_1"/>	<input type="text" value="DOOR OPEN"/>	<input type="text" value="IOMod88_1"/>	<input type="text" value="DI1"/>	<input type="text" value="0"/>	<input type="text"/>	<input type="text"/>	<input type="text" value="cot=20,org=0"/>	<input type="text" value="2025-05-26 18:22:05.54"/>

In every signals sheet, there is a signal named COMMUNICATION STATUS. This signal indicates whether the WCC Lite has established a connection with the device.

signal_name	device_alias	signal_alias	source_device_alias	source_signal_alias	enable	math_expression	multiply	add	operation	units	min_value	max_value	absolute_threshold	threshold_units	suppression_time_ms	suppression_values	gl	log	common_address	info_address	data_type	tag_job_todo
DI7	IOMod88_1	DI7			1								0.1	real			1	1	1	15	30	
DI8	IOMod88_1	DI8			1								0.1	real			1	1	1	16	30	
status DO1	IOMod88_1	DO1_status			1								0.1	real			1	1	1	1	30	
status DO2	IOMod88_1	DO2_status			1								0.1	real			1	1	1	2	30	
status DO3	IOMod88_1	DO3_status			1								0.1	real			1	1	1	3	30	
status DO4	IOMod88_1	DO4_status			1								0.1	real			1	1	1	4	30	
status DO5	IOMod88_1	DO5_status			1								0.1	real			1	1	1	5	30	
status DO6	IOMod88_1	DO6_status			1								0.1	real			1	1	1	6	30	
status DO7	IOMod88_1	DO7_status			1								0.1	real			1	1	1	7	30	
status DO8	IOMod88_1	DO8_status			1								0.1	real			1	1	1	8	30	
DO1	IOMod88_1	DO1	IEC104_SCADA	IEC104_SCADA_DO1	1												1	0	1	101	45	
DO2	IOMod88_1	DO2	IEC104_SCADA	IEC104_SCADA_DO2	1												1	0	1	102	45	
DO3	IOMod88_1	DO3	IEC101_SCADA	IEC101_SCADA_DO3	1												1	0	1	103	45	
DO4	IOMod88_1	DO4	IEC101_SCADA	IEC101_SCADA_DO4	1												1	0	1	104	45	
DO5	IOMod88_1	DO5	IEC101_SCADA	IEC101_SCADA_DO5	1												1	0	1	105	45	
DO6	IOMod88_1	DO6	IEC101_SCADA	IEC101_SCADA_DO6	1												1	0	1	106	45	
DO7	IOMod88_1	DO7	IEC101_SCADA	IEC101_SCADA_DO7	1												1	0	1	107	45	
DO8	IOMod88_1	DO8	IEC101_SCADA	IEC101_SCADA_DO8	1												1	0	1	108	45	
COMMUNICATION STATUS	IOMod88_1	comm_stat			1												1	1			communication_status	

If everything is connected correctly and the service is running, the COMMUNICATION STATUS should display a value of 1. If not connected, it will display a value of 2.

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☐ Column filter

Device name	Signal name	Device alias	Signal alias	Value	Units	State	Attributes	Time
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
IOMod 8DI8DO_1	COMMUNICATION STATUS	IOMod88_1	comm_stat	1				2025-05-26 18:22:05.41

If the IOMOD needs to be connected to another port, you can change the configuration by updating the Device value in the Devices sheet from PORT1 to PORT2.


name	description	device_alias	enable	protocol	device	baudrate	databits	stopbits	parity	flowcontrol	scan_rate_ms	retry_count	timeout_ms	link_address	asdu_address	time_sync_interval_sec	gl_interval_sec	bind_address	host	port	asdu_size	col_size	row_size	rtt	port	11	12	13	time_sync	message_size	cache_size
IOMod 8DI8DO_1	IOMod 8DI8DO via IEC101	IOMod88_1	1	IEC 60870-5-101 master	PORT1	9600	8	1	none	none	300	3	1000	1	1	300	300				1	1	2								
IOMod 8DI8DO_2	IOMod 8DI8DO via IEC101	IOMod88_2	1	IEC 60870-5-101 master	PORT1	9600	8	1	none	none	300	3	1000	2	2	300	300				1	1	2								
IEC104 SCADA system	IEC104 SCADA signals	IEC104_SCADA	1	IEC 60870-5-104 slave														0.0.0.0	192.168.1.2	2404	2	2	3	8	12	15	10	20	1	249	100
IEC101 SCADA system	IEC101 SCADA signals	IEC101_SCADA	1	IEC 60870-5-101 slave	PORT2	9600	8	1	none	none											1	1	2								

Please note that each port on the WCC Lite can only run a single protocol. Mixing different protocols on the same port is not supported. In addition, each device must have unique values for parameters such as ID, link address, and ASDU address.

Simulating SCADA via Vinci software

After uploading the Excel configuration, you can simulate a SCADA connection using Vinci software. To simulate an IEC 104 slave, select the IEC 60870-5-104 protocol, choose Master (Client) mode, and press Start. In the Settings tab, make sure the Structure (COT, ASDU, and IOA size), Timeouts, and Windows values match those defined in the Excel configuration.

File Tags Options Hardware Help

 Protocol: IEC 60870-5-104 Mode: Master (Client) **START**

Settings Console Statistic

Structure

COT size in bytes: 2
ASDU size in bytes: 2
IOA size in bytes: 3

Parameters

☒ Send Start DT on start up
☒ Auto ack. Test Frame

Security

☐ Enable TLS

Timeouts


t0 in seconds: 30
t1 in seconds: 15
t2 in seconds: 10
t3 in seconds: 20

Windows

RWT (w) size: 8
SWT (k) size: 12

Set the correct IP address and port at the top of the Vinci window. The default IEC104 port is 2404. The IP address should match the IP of your WCC Lite device (by default, 192.168.1.1 if connected directly to your computer via Ethernet).

File Tags Options Hardware Help


 Protocol: IEC 60870-5-104 Mode: Master (Client) **START** IP: 192.168.1.1 Port: 2404

Settings Console Statistic

After clicking Start, open the Protocol Connections tab again to verify that the IEC104 slave is connected.

PROTOCOL HUB	STATUS	SYSTEM	SERVICES	NETWORK	USERS	LOGOUT (ROOT)	WCC LITE
CONFIGURATION	IMPORTED SIGNALS	EVENT LOG	PROTOCOL CONNECTIONS	PROTOCOL LOGGER	SCRIPT-RUNNER		
PROTOCOL CONNECTIONS							
Device name	Device alias	Protocol	Host	Status	Timestamp		
IOMod 8DI8DO_2	IOMod88_2	IEC 60870-5-101 master	PORT1	Connected	2025-05-26 18:22:05		
IOMod 8DI8DO_1	IOMod88_1	IEC 60870-5-101 master	PORT1	Connected	2025-05-26 18:22:05		
IEC104 SCADA system	IEC104_SCADA	IEC 60870-5-104 slave	192.168.1.2	Connected	2025-05-26 18:22:05		
IEC101 SCADA system	IEC101_SCADA	IEC 60870-5-101 slave	PORT2	Disconnected	2025-05-26 18:21:59		

Once the IEC104 slave is connected, send a General Interrogation (GI) command. If everything is working correctly, the Statistics tab in Vinci should begin to display live data.

THE VINCI PROTOCOL ANALYZER								
File	Tags	Options	Hardware	Help				
	Protocol:	IEC 60870-5-104	STOP	IP:	192.168.1.1	Extra		
	Mode:	Master (Client)		Port:	2404	Interface info	Ping	Sockets
Settings	Console	Statistic						
TI	Cause	ASDU	IOA	Value	Status	TimeTag	Name	Count
C_IC_NA_1 (100)	Pos. ActTem (10...	1	0		Global			3
M_SP_NA_1 (1)	Inrogen (20)	1	1	Off[0]				1
M_SP_NA_1 (1)	Inrogen (20)	1	2	Off[0]				1
M_SP_NA_1 (1)	Inrogen (20)	1	3	Off[0]				1
M_SP_NA_1 (1)	Inrogen (20)	1	4	Off[0]				1
M_SP_NA_1 (1)	Inrogen (20)	1	5	Off[0]				1
M_SP_NA_1 (1)	Inrogen (20)	1	6	Off[0]				1
M_SP_NA_1 (1)	Inrogen (20)	1	7	Off[0]				1
M_SP_NA_1 (1)	Inrogen (20)	1	8	Off[0]				1
M_SP_NA_1 (1)	Inrogen (20)	1	9	Off[0]				1
M_SP_NA_1 (1)	Inrogen (20)	1	10	Off[0]				1
M_SP_NA_1 (1)	Inrogen (20)	1	11	Off[0]				1
M_SP_NA_1 (1)	Inrogen (20)	1	12	Off[0]				1
M_SP_NA_1 (1)	Inrogen (20)	1	13	Off[0]				1
M_SP_NA_1 (1)	Inrogen (20)	1	14	Off[0]				1
M_SP_NA_1 (1)	Inrogen (20)	1	15	Off[0]				1
M_SP_NA_1 (1)	Inrogen (20)	1	16	Off[0]				1
C_IC_NA_1 (100)	Pos. ActTem (10...	2	0		Global			3
M_SP_NA_1 (1)	Inrogen (20)	2	1	Off[0]				1
M_SP_NA_1 (1)	Inrogen (20)	2	2	Off[0]				1
M_SP_NA_1 (1)	Inrogen (20)	2	3	Off[0]				1
M_SP_NA_1 (1)	Inrogen (20)	2	4	Off[0]				1
M_SP_NA_1 (1)	Inrogen (20)	2	5	Off[0]				1
M_SP_NA_1 (1)	Inrogen (20)	2	6	Off[0]				1
M_SP_NA_1 (1)	Inrogen (20)	2	7	Off[0]				1
M_SP_NA_1 (1)	Inrogen (20)	2	8	Off[0]				1
M_SP_NA_1 (1)	Inrogen (20)	2	9	Off[0]				1
M_SP_NA_1 (1)	Inrogen (20)	2	10	Off[0]				1
M_SP_NA_1 (1)	Inrogen (20)	2	11	Off[0]				1
M_SP_NA_1 (1)	Inrogen (20)	2	12	Off[0]				1
M_SP_NA_1 (1)	Inrogen (20)	2	13	Off[0]				1
M_SP_NA_1 (1)	Inrogen (20)	2	14	Off[0]				1
M_SP_NA_1 (1)	Inrogen (20)	2	15	Off[0]				1
M_SP_NA_1 (1)	Inrogen (20)	2	16	Off[0]				1

To test further, let's activate the first digital output (DO1) on both IOMODs. To do this, we will send a type 45 command (C_SC_NA_1).

In the Excel configuration, under the sheet *Signals_IEC104*, we specified that to activate the output on the first IOMOD, the command must be sent with the following parameters:
ASDU (common_address) = 1, IOA (info_address) = 101, type (data_type) = 45.

